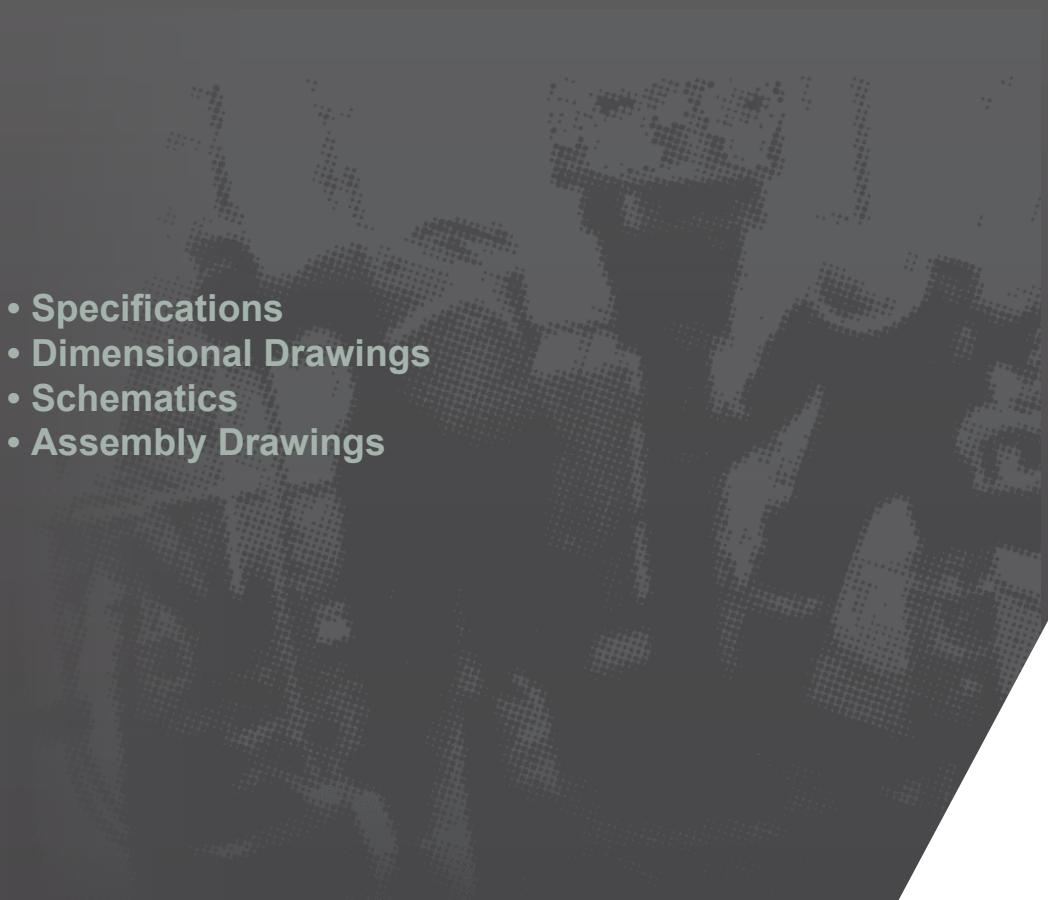
Spare Parts / Specifications Manual

DPU660-09 Diesel Hydraulic Power Unit



- Specifications
- Dimensional Drawings
- Schematics
- Assembly Drawings

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McCoy has made every effort to ensure the information contained in this document is accurate and current. This manual is intended to provide equipment operation and safety instructions for your equipment. However, McCoy does not warrant or guarantee that the information is either complete or accurate in every respect and the user of the manual should consult with its McCoy sales representative for any clarifications and updates.

The user of the manual shall protect, indemnify, and hold harmless McCoy and its directors, officers, employees, and agents from and against all liability for personal injury, death, or property damage resulting directly or indirectly from the use of the information contained in this manual.

Observance of all descriptions, information and instructions set out in this manual is the full responsibility of the user. This manual is intended for guidance and informational purposes and must be used in association with adequate training and on-the-job supervision to provide safe and effective equipment use.

It is the responsibility of the user to conform to all regulations and requirements issued by an authority or agency which may affect the operation, safety or equipment integrity, that may overrule the content of this documentation.

The user will acknowledge and obey any general legal or other mandatory regulation in force relating to accident prevention, safety, and equipment integrity.

WARNING

READ BEFORE USING EQUIPMENT

This Spare Parts / Specifications Manual is intended to be used as a companion to the Operator's Manual. **DO NOT operate equipment without fully reviewing and complying with all safety guidelines outlined in the separate Operator's Manual**.

Please contact McCoy Drilling & Completions customer service to obtain the appropriate Operator's Manual if it has not been made available to you.

All components are suitable for their intended use and meet McCoy safety requirements for normal use. Third party components present on this equipment should be maintained as outlined in their respective Original Equipment Manufacturer's (OEM) documentation which is not covered in this manual.

McCoy Drilling & Completions | Superior
4225 Hwy 90 East • Broussard, LA USA
T: 1.337.837.8847
F: 1.337.837.8839
salesSuperior@mccoyglobal.com

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Specifications

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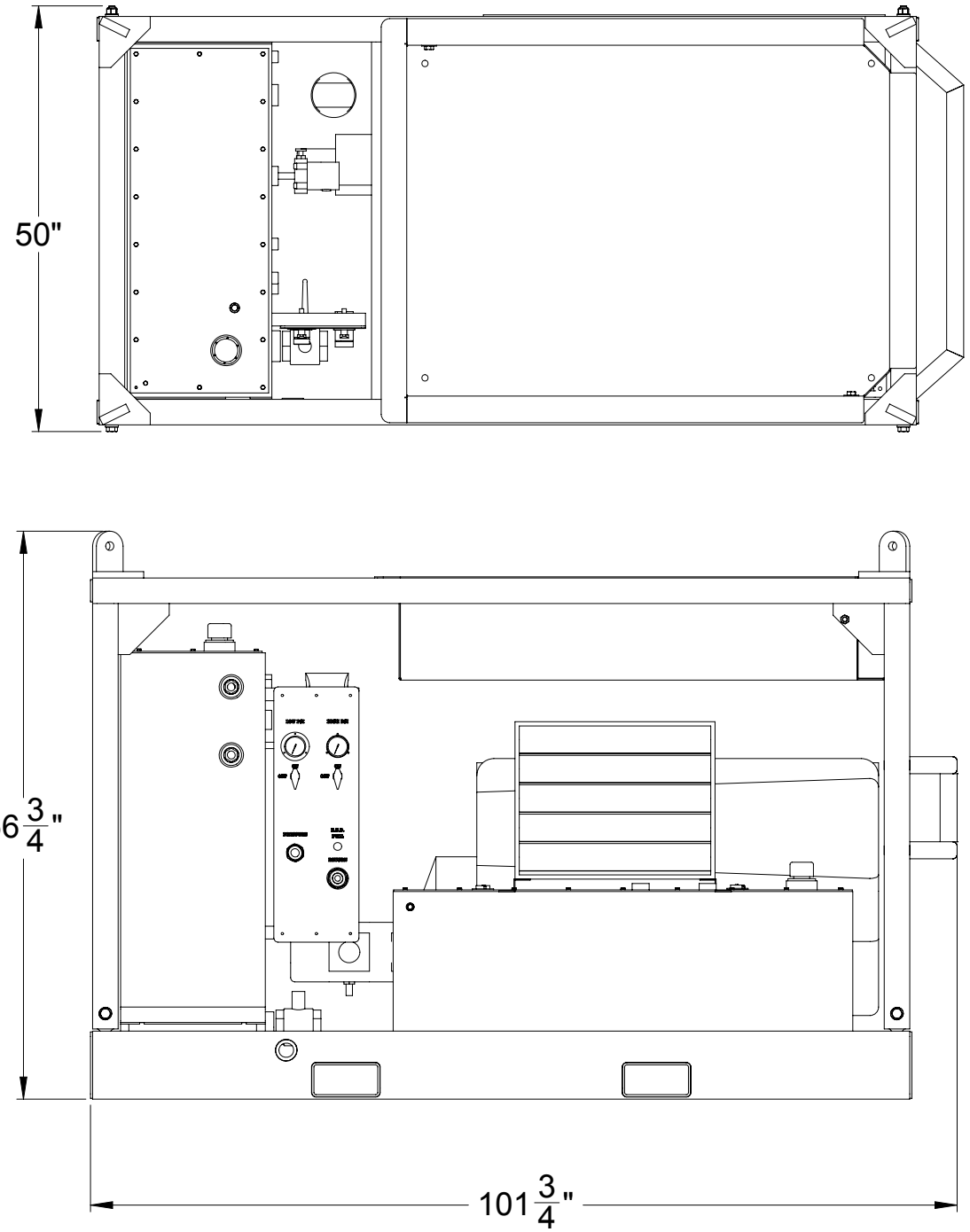
	4,200 lbs (approx.)
	1,905 kg (approx.)



Specifications

Diesel Motor Output	114 HP @ 2,300 RPM
Maximum Flow	60 GPM @ 1,000 PSI
Maximum Pressure	3,000 PSI
Hydraulic Oil Capacity	140 US GAL.
Diesel Tank Capacity	42 US GAL.
Operation Type	Open loop for over-center valve
Decibel Readings: 1.0 meter, 1 min	94 db (A), 97 db (C)

Spare Parts Recommendations

Qty	Part Number	Part Name
1	GNSH20-20	Dual Gear Pump 60GPM
2	P164697	Filter Elements
1	2.5 Strainer	Suction Strainer
1	1441	1” Male Quick Disconnect
1	1440	1” Female Quick Disconnect
1	1446	1 1/4” Male Quick Disconnect
1	1445	1 1/4” Female Quick Disconnect

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Schematics

Power Unit Hydraulic Schematic 12

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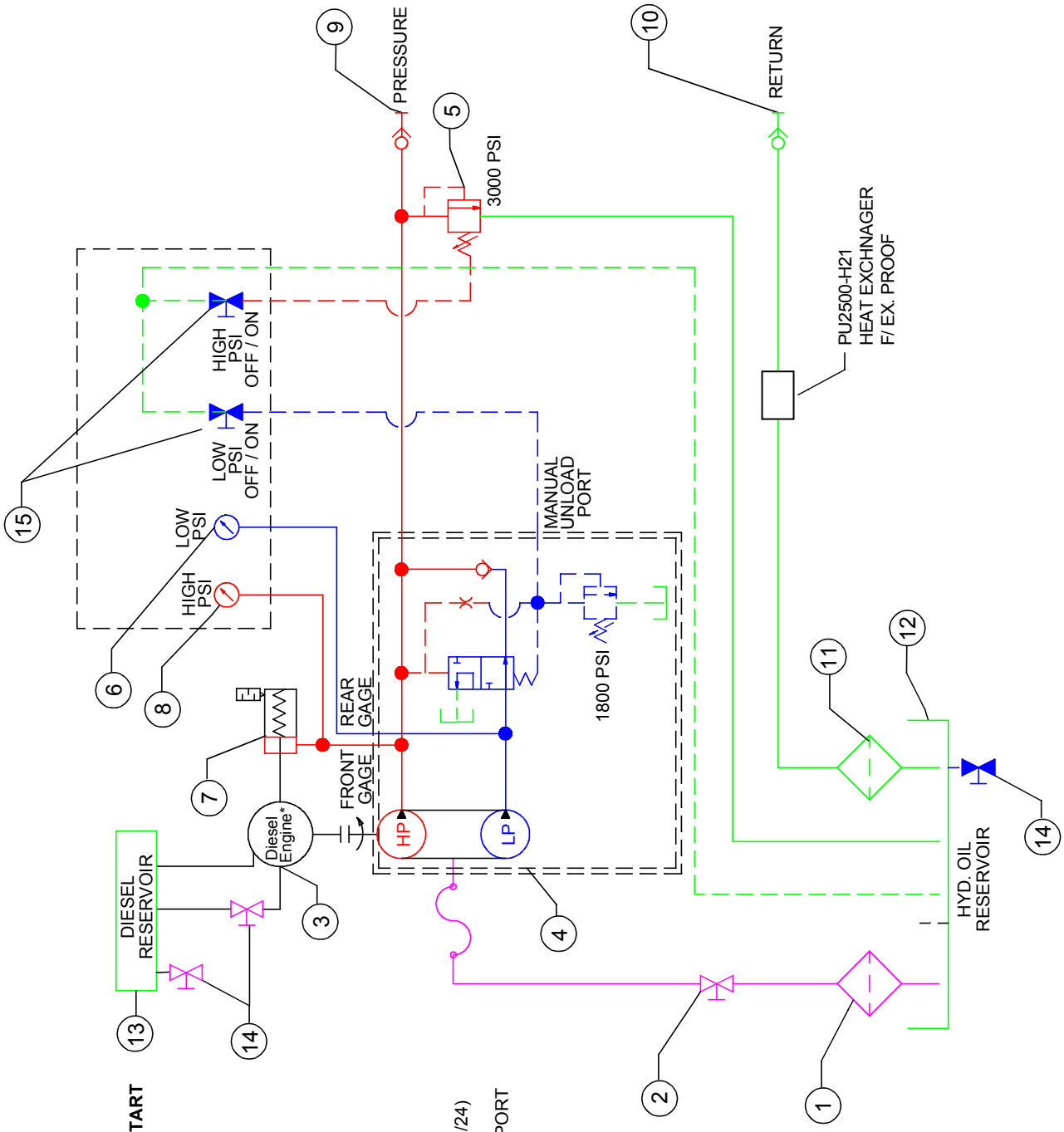

***DPU660-09 UTILIZES AN ELECTRIC START**
DPU660-11 UTILIZES AN AIR START

PUMP SPECIFICATIONS

3.97 IN^3/REV EACH SECTION
30 GPM EACH SECTION AT 1800 RPM
3000 PSI MAX., 2500 RPM MAX.
SAE C MTG. SAE C SPLINED SHAFT (14T 12/24)
2 1/2" C61 INLET, 1" C61 OUTLET
#6 SAE O-RING GAGE PORTS AND UNLOAD PORT

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HYDRAULIC SCHEMATIC DIAGRAMA ESQUEMÁTICO HIDRÁULICO				
BILL OF MATERIALS CUENTA DE MATERIALES				
Item Artículo	***Quantity Cantidad***	***Part Number Parte Número***	***English Description Inglés Descripción***	***Spanish Description Español Descripción***
1	1	2.5 STRAINER	Suction Strainer	Succión Tamiz
2	1	1458	Suction Ball Valve, 2 1/2" NPT	Succión Bola Válvula, 2 1/2" NPT
3	1	F6L914	6 Cylinder Diesel Engine with Pump Drive	6 Cilindro Motor diesel con la impulsión de la bomba
4	1	GNSH20-20	Dual Gear Pump with Hi / Lo Valve 60 GPM	Dual Engranaje Bomba con Alto / Bajo Válvula 60 GPM
5	1	2070	System Relief Valve	Sistema Relevación Válvula
6	1	BAC-3M25RCFF	Pressure Gauge, 0-3000	Presión Galga, 0-3000
7	1	7040HL-011	Throttle Cylinder Assembly	Válvula Reguladora Cilindro Asamblea
8	1	BAC-5M25RCFF	Pressure Gauge, 0-5000	Presión Galga, 0-5000
9 *	1	1440	1" Quick Disconnect – Female	1" Aprisa Desconexión – Hembra
10 *	1	1445	1 1/4" Quick Disconnect – Female	1 1/4" Aprisa Desconexión – Hembra
11	1	DPU660-S1	Return Filter	Vuelta Filtro
12	1	HRES-150	Reservoir, 140 Gallons	Depósito, 140 Galones
13	1	DT-45G	Diesel Tank 42 Gallon	Diesel Tanque 42 Galón
14	3	1205	1/2" Ball Valve, NPT, Low PSI	1/2" Bola Válvula, NPT, Bajo PSI
15	2	1508	1/4" Stainless Ball Valve, High PSI	1/4" Inoxidable Bola Válvula, Alto PSI

* FARR Specifications call for Male Quick Disconnects in place of Female

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Assembly Drawings

DPU660-09 Diesel Power Unit Assembly.....17

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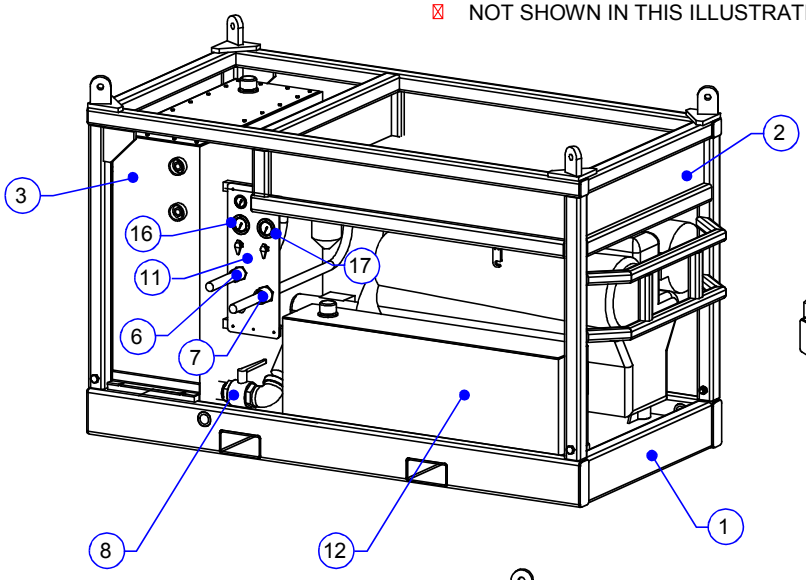
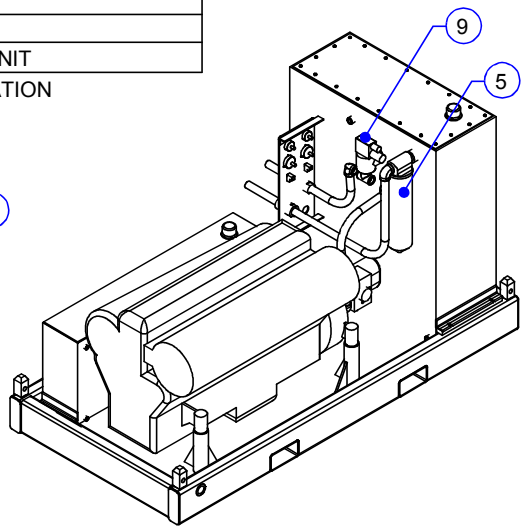
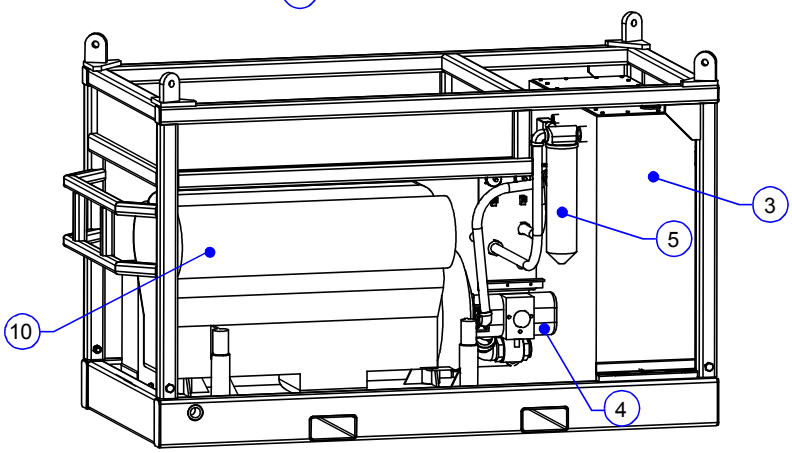
Assembly Drawings

Item	DPU660-05 Quantity	DPU660-06 Quantity	Part Number	Description
1	1	1	DSKD-02	SKID FOR 6 CYL. DIESEL POWER UNIT
2	1	1	DBSKT-02	HOSE BASKET FRAME FOR DIESEL POWER UNIT
3	1	1	HRES-150	HYDRAULIC RESERVOIR - 140 GALLONS
4	1	1	GNSH20-20	DOUBLE GEAR PUMP W/ HI/LOW VALVE
				60 GPM / 60 GPM, 3000 PSI
5	1	1	DPU660-S1	RETURN FILTER
6	1	1	1440	1" FEMALE QUICK DISCONNECT
7	1	1	1445	1-1/4" FEMALE QUICK DISCONNECT
8	1	1	1458	BALL VALVE, 2-1/2" L/P
9	1	1	2070	1-1/4" NPT RELIEF VALVE (DUMP VALVE)
10	1	1	F6L914	6 CYL. DIESEL ENGINE W/ PUMP DRIVE
11	1	1	7042HL-013	GAUGE / BULKHEAD PANEL ASSEMBLY
12	1	1	DT-45G	DIESEL TANK - 42 GALLON
13	1	1	2.5 STRAINER ☒	SUCTION STRAINER
14	1	1	7040HL-011 ☒	THROTTLE CYLINDER ASSEMBLY
15	1	1	7042HL-015 ☒	EMERGENCY STOP LABEL
16	1	1	BAC-3M25RCFF	GAUGE, 0-3000 PSI
17	1	1	BAC-5M25RCFF	GAUGE, 0-5000 PSI
18	3	3	1205 ☒	1/2" BRASS BALL VALVE L.P.
19	2	2	1508 ☒	1/4" SS H.P. VALVE
20	0	1	HAK050017 ☒	RETURN FILTER
21	0	1	DPU660-S2 ☒	KILL FROST LUBRICATOR
22	1	1	KITFIT-DPU660 ☒	FITTING KIT F/6 CYL. POWER UNIT
			☒	NOT SHOWN IN THIS ILLUSTRATION





POWER UNIT WITHOUT HOSE BASKET FRAME



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T: 337.837.8847
F: 337.837.8839
salesSuperior@mccoyglobal.com

Operator's Manual

Hydraulic Power Unit

- Commissioning
- Operation
- Maintenance
- Troubleshooting
- Decommissioning

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⚠ READ BEFORE USING EQUIPMENT⚠

Personnel
As a minimum, we recommend that all personnel operating or working in the vicinity of hydraulic equipment wear basic PPE (Personal Protective Equipment) such as eye, ear, head, hand, and foot protection. Only trained and competent users should be allowed to directly operate or operate around McCoy equipment. Safety guidelines suggested by McCoy are in no way intended to supersede the specific health and safety regulations outlined by the end user. Personnel safety guidelines and safe workplace practices are the responsibility of the end user.

Intent of Use
The hydraulic equipment provided should only be used for the intended purposes as outlined by McCoy. Any attempt to use equipment for purposes other than its original intent exposes personnel to potentially unforeseen hazards and will void all warranties guaranteed by McCoy.

Modification of Equipment
Any attempt by the user to apply unapproved modifications to the equipment exposes personnel to potential hazards and will void all warranties guaranteed by McCoy. This includes but is not limited to: bypassing or otherwise disabling engineered safety features, use of unapproved replacement parts, or jury-rigging of any component or feature.

Nature of Equipment
When attempting any operation with McCoy equipment, the heavy duty nature of the equipment and extreme forces generated when the equipment components are put into motion should always be taken into account in order to maximize user safety and maintain equipment longevity.

Rotary Components
Equipment doors should never be opened when equipment components are under load or rotating at a high rate of speed, as this puts tremendous stress on internal components and may lead to equipment failure. Any damage incurred as a result is not covered under any warranties.

Damaged or Faulty Components
Equipment with components that are operating in a faulty manner or have otherwise been significantly damaged must be immediately removed from service until such a time that it can be repaired or replaced by a qualified technician. Continued use of faulty or damaged equipment exposes personnel to significant hazards and may compromise the longevity of the equipment.

Local Regulations
When placing equipment into service, local laws, codes, and regulations must be considered and adhered to. It is the responsibility of the end user to be aware of any such regulations and make preparations accordingly before placing equipment into service.

Hydraulic Oil
Hydraulic oil used in McCoy equipment must be filtered to a minimum of 10 microns. Hydraulic oil contamination can be the cause of many costly repairs. Please review the Hydraulic Fluid Maintenance section before implementing a hydraulic fluid maintenance routine.

Die Selection
Never attempt to clamp onto tubulars with incorrectly sized dies. It is imperative that operators be aware of the size of tubular to be gripped and that the jaw and die system in use is appropriately sized. Use of incorrectly size dies poses a hazard to personnel and may damage equipment. Please see your equipment's Spare Parts Manual for a list of compatible jaws & dies.

Electrical Components
Extreme caution must be exercised when connecting or disconnecting electrical cables when in a potentially hazardous environment. Electrical boxes which are pre-sealed from the factory must never be opened due to the risk of spark in potentially explosive atmospheres.

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Pinch / Touch Points

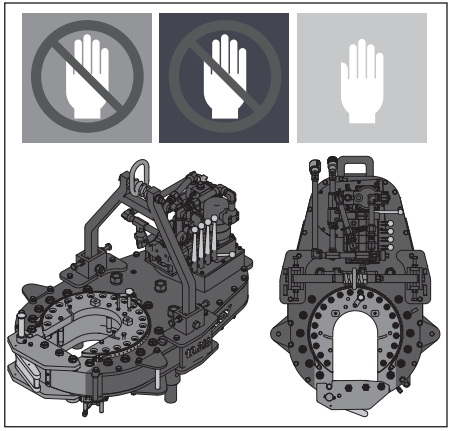
All OEM warning stickers should be closely observed. Users of manually operated equipment should be properly trained in its use and be acutely aware of the potential hazards the equipment poses to them and surrounding personnel. McCoy recommends adopting a 'touch point' paint scheme to highlight areas which are acceptable to touch on the equipment. **All areas which are not designated as an operation lever or a safety handle should NEVER be touched or used as a manipulation handle by users, unless the equipment is fully de-pressurized and is undergoing servicing by a qualified technician.**

⚠ WARNING

Placing limbs on or near areas of equipment designated as a pinch point or a non 'touch point' may result in serious injury or death.

⚠ WARNING

Use of any non-approved tong position manipulation devices may expose personnel to significant hazards.



Pinch / Touch Point Paint Schemes & Warning Labels

All McCoy equipment comes from the factory painted according to our CE compliant Pinch/Touch Point paint scheme, as well as with warning labels designed to alert users to potential danger. Upon repainting your equipment, McCoy recommends adopting a similar paint scheme to reduce the risk of injury to operators and surrounding personnel.

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General

About This Manual

This manual is intended to give users general guidelines on operating and working around McCoy equipment, as well as to encourage good maintenance practices which will extend product life.

Illustrations contained within are provided as a general reference and may not match the appearance, configuration, or installed features of your equipment. This manual is intended as a companion to the model specific Spare Parts & Specifications manual, which contains assembly drawings, specifications, and schematics relevant to your equipment. Please contact our customer service department to obtain a copy of either of these manuals.

Hazard Notification

Throughout this manual, important notifications and warnings appear intended to alert the user of potential danger or practices which must be observed. It is imperative that all notice or warning boxes be observed.

NOTICE

A notice box indicates a piece of information which requires extra attention from the user.

⚠ WARNING

A warning box indicates information which, if not properly observed, may expose users to significant hazards that may result in severe injury or death.

Maintenance & Service

By following the maintenance guidelines outlined in this manual, the life of your equipment can be drastically increased. The information provided is intended to serve as a basis for a robust maintenance program. It is the responsibility of the end user to customize and add to their own program based on logistical and other concerns.

Should your equipment require servicing, McCoy Drilling & Completions offers a full hydraulic service shop to meet your needs. Please contact McCoy Drilling & Completions customer service department for more information.

All equipment components are suitable for their intended use and meet McCoy safety requirements for normal use. Third party components present on this equipment should be maintained as outlined in their respective Original Equipment Manufacturer's (OEM) documentation which is not covered in this manual.

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Only authorised personnel who are deemed competent to operate, maintain, and repair this equipment may do so.

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Thank You.

We at McCoy would like to thank you for entrusting our equipment to meet your Drilling & Completions needs.

This manual is intended to give users general guidelines on operating and working around McCoy equipment, as well as to encourage good maintenance practices which will extend product life.

Illustrations contained within are provided as a general reference and may not match the appearance, configuration, or installed features of your equipment. This manual is intended as a companion to the model specific Spare Parts & Specifications manual, which contains assembly drawings, specifications, and schematics relevant to your equipment. Please contact our customer service department to obtain a copy of either of these manuals.

Contacting McCoy

McCoy Drilling & Completions
4225 Hwy 90 East • Broussard, LA USA
T: 1.337.837.8847
F: 1.337.837.8839
dcsales@mccoyglobal.com

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Section 1

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1-1.2 Basic Diesel Power Unit Component Identification
1-1.3 Basic RP Style Console / Power Unit Component Identification
1-1.4 Connection Panel Item Identification

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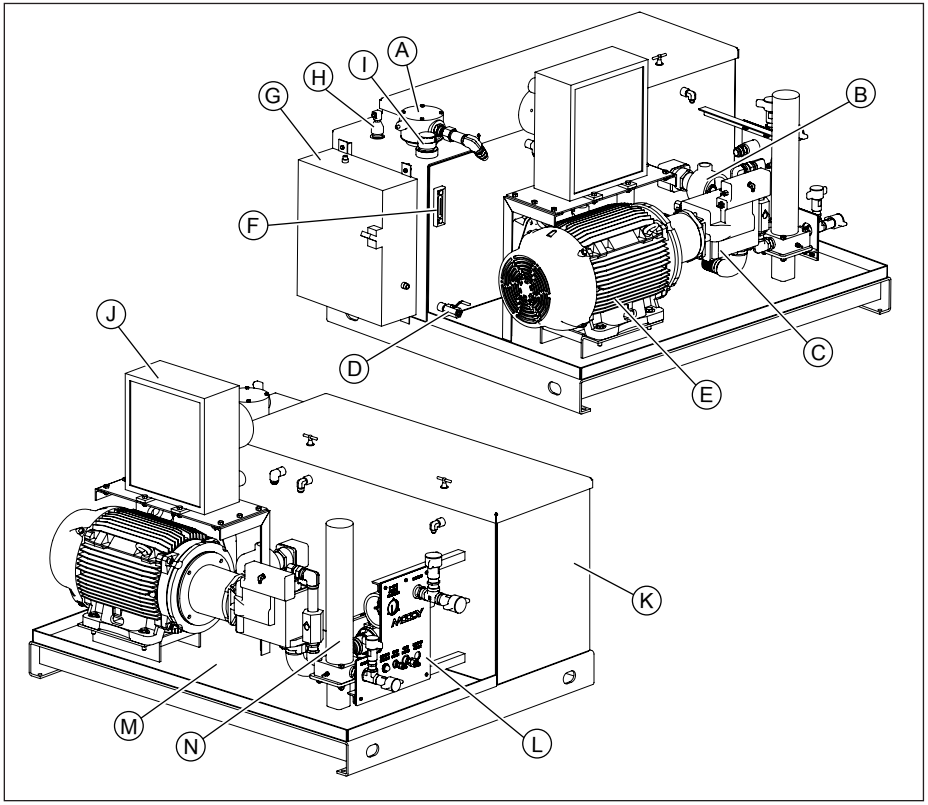
1-1.1 Basic Electric Power Unit Component Identification



A. Hydraulic Oil Filter
B. Power Connection Box
C. Hydraulic Pump Assembly
D. Hydraulic Reservoir Drain Valve
E. Electric Motor
F. Hydraulic Oil Level Sight Gauge
G. Starter Box
H. Low Oil Level Shutdown
I. Hydraulic Oil Filler Cap
J. Heat Exchanger
K. Hydraulic Oil Reservoir
L. Connection Panel
M. Skid Weldment
N. High Pressure Filter

NOTICE

This illustration is to be used as a general reference. Your equipment may vary greatly in appearance due to the wide range of equipment options available throughout our product line. Please refer to your tool's specific spare parts manual for a more accurate component assembly drawing.

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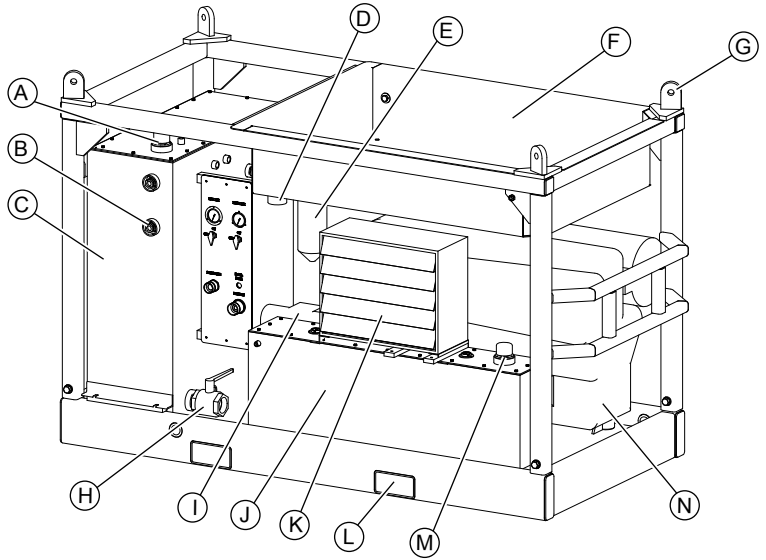
1-1.2 Basic Diesel Power Unit Component Identification



A. Hydraulic Oil Filler Cap
B. Sight Glass
C. Hydraulic Oil Reservoir
D. Dump Valve
E. Hydraulic Return Filter
F. Hose Basket
G. Lifting Eye
H. Hydraulic Oil Reservoir Drain Valve
I. Hydraulic Pump
J. Diesel Tank
K. Heat Exchanger
L. Forklift Lifting Tube
M. Diesel Tank Filler Cap
N. Diesel Engine

NOTICE

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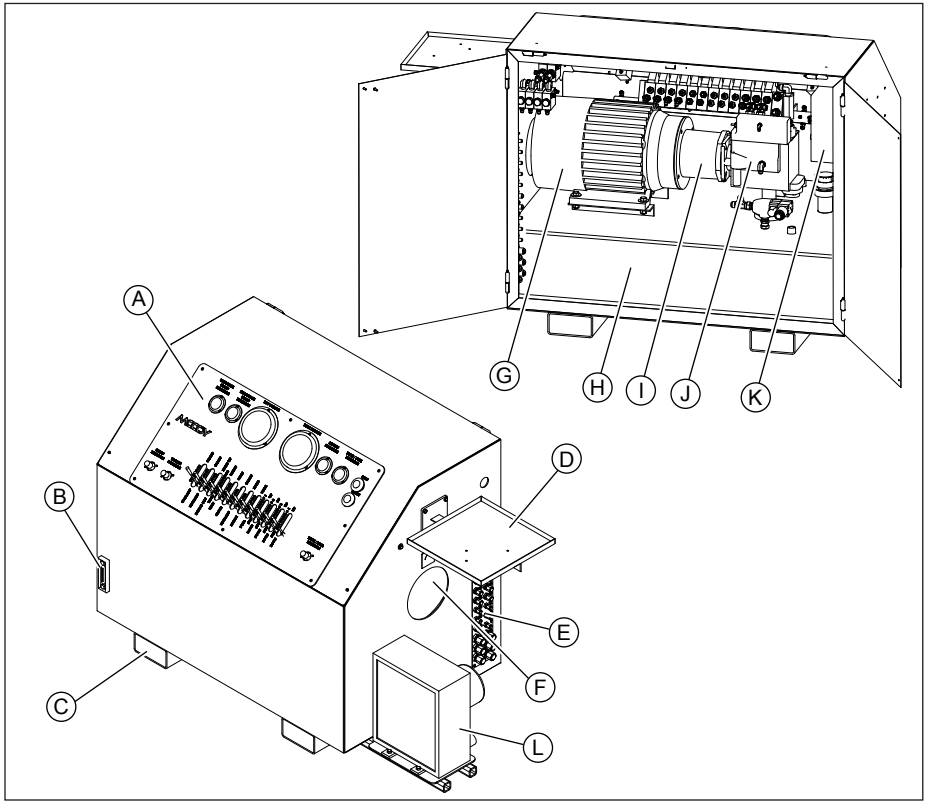
1-1.3 Basic RP Style Console / Power Unit Component Identification



A. Control Console Gauge / Valve Panel
B. Hydraulic Oil Level Sight Gauge
C. Forklift Tube
D. Torque Turn Computer Table
E. Hydraulic Connection Bulkhead
F. Motor Rotation Window / Indicator Arrow
G. Electric Motor
H. Hydraulic Oil Reservoir
I. Hydraulic Motor / Pump Coupling
J. Hydraulic Pump
K. Electrical Box
L. Heat Exchanger

NOTICE

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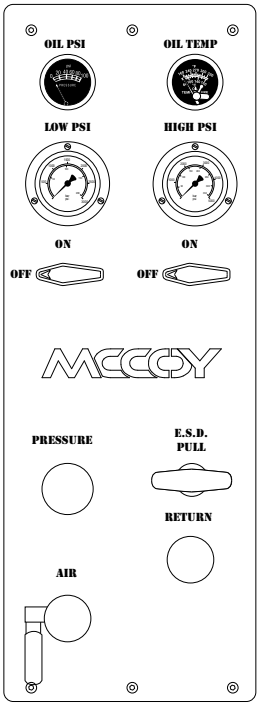
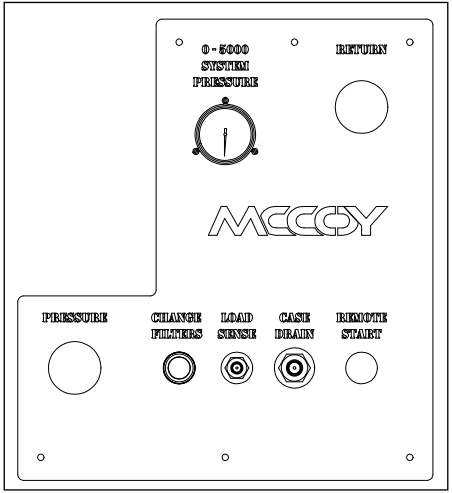
1-1.4 Connection Panel Item Identification





- **0 - 5000 System Pressure**: Gauge showing current hydraulic system pressure
- **Return**: Port to connect the hydraulic return line.
- **Pressure**: Port to connect the hydraulic pressure line.
- **Change Filters Indicator Light**: When lit, indicates that it is time to replace the hydraulic filter elements.
- **Load Sense**: Connection point to connect the load sense feature of the power unit's hydraulic pump.
- **Case Drain**: Connection point for the case drain
- **Remote Start**: Connection point for remote start
- **Air**: Connection point for compressed air
- **E.S.D Pull**: Emergency Shut Down pull lever to be used in emergency situations only.
- **Oil PSI**: Gauge which displays current engine oil pressure
- **Oil Temp**: Gauge which displays current engine oil temperature
- **Low PSI**: 0-3000 pressure gauge displaying current system pressure
- **High PSI**: 0-5000 pressure gauge displaying current system pressure

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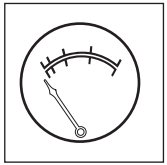

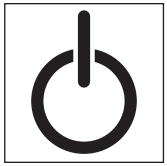

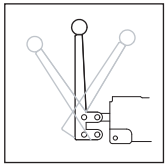

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2-3 Operation
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- 2-3.2 Depressurization Procedure

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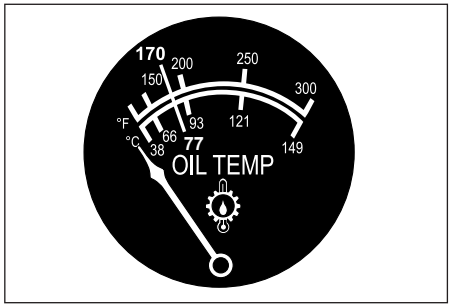
2-1.1 Operating Temperature

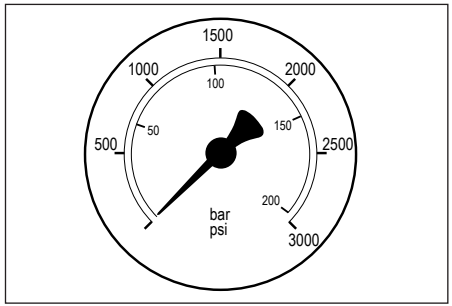


- ISO68 hydraulic oil is designed to operate at a temperature range of 130 degrees F (55 degrees C) to 170 degrees F (77 degrees C), in order to maintain proper viscosity of 100 SSU. The use of an oil cooler may be required if the operating temperature reaches the maximum temperature.
- This equipment is designed to operate at a maximum acceptable working temperature of 190° (87° C) measured at external bearing caps or other similar surfaces.

⚠ WARNING

Equipment and hydraulic hoses reach temperatures during normal operation that can cause severe burns. Appropriate hand protection should be worn at all times to avoid injury.

2-1.2 Operating Pressure



- Most hydraulic components are designed with a maximum working pressure of 3,000 PSI (207 bar).
- Certain components, such as hydraulic cylinders used as remotely controlled actuators, have working pressure limits of 1500 PSI (103 bar).

⚠ WARNING

Hydraulic reducing valves are used to limit pressure to certain components and must never be adjusted. Adjusting these valves beyond factory settings can result in equipment failure, hydraulic leaks, and can expose personnel to hazards that can result in serious injury or death.

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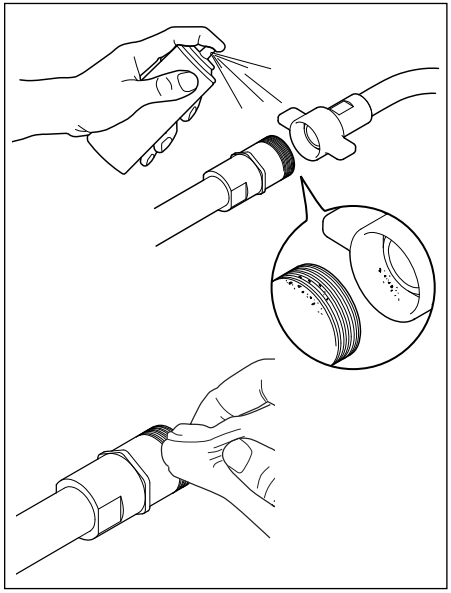
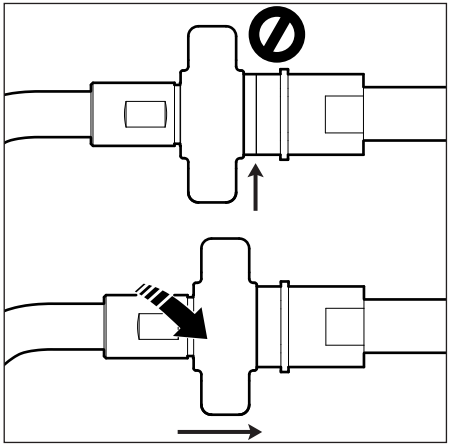
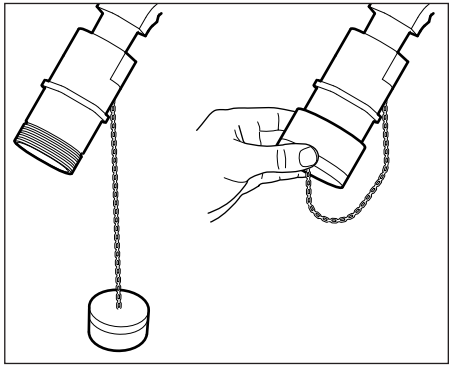
2-2.1 Making Up / Breaking Out Hydraulic Connections



- Before connecting any hydraulic joint, always inspect hoses for damage and any dirt or contaminants. Clean as necessary with compressed air or an approved cleaning solvent in combination with a lint-free cloth.



- Wing type hydraulic disconnects should always be fully made up to the connection line on the joint. Prior to pressurizing the hydraulic system, all hydraulic connections should be inspected to ensure a secure connection has been established.
- Before attempting to break out hydraulic connections, assure that the tong has be depressurized and is fully disconnected from any hydraulic power sources. Hydraulic return lines should always be made up first and broken out last in order to insure that pressure is not trapped in the valve package.



- Attached to each hydraulic outlet is a brass (or plastic) dust cap. Whenever a hose is disconnected, dust caps should always be reattached to prevent contaminants from entering the hydraulic system.

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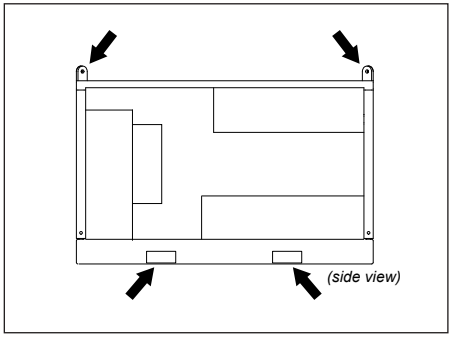
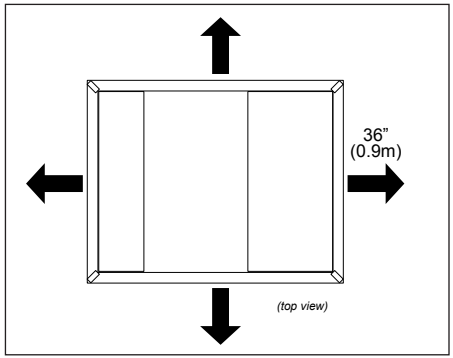
2-2.2 Moving and Placing the Unit



- Lifting of the power unit should always be performed by using either the pad eye lifting mounts located at the top of the frame or the forklift lifting slots located at the base of the frame.
- When lifting with cables attached to the pad-eye lifting mounts, lifting should only be performed with all four (4) points bearing the load evenly in a stable, level manner. Any sling or lifting device and associated rigging equipment should be, at minimum, rated to lift the total weight of the power unit multiplied by a factor of two (2). Refer to unit's specifications manual for approximate weights.
- For additional information regarding proper rigging and overhead lifting , refer to OSHA, ASME B30.9-2006. For additional information on load bearing devices, see OSHA 1910.184, ANSI/ASME B30.9 "SLINGS", ANSI/ASME B30.10 "HOOKS" and ANSI/ASME B30.26 "RIGGING HARDWARE".
- All load bearing devices provided are tested to 1.5x - 2x their reported carry weight and are issued certification tags. It is the responsibility of the end user to re-certify these devices at regular intervals (maximum 9 months as per AUWED 95/63/Ec (LOLER) in the EEA) to assure maximum safety.

⚠ WARNING

Any load bearing device that is observed to have visible damage or is otherwise compromised must be immediately removed from service until it can be repaired or replaced.



- The power unit should only be set down on a level surface with adequate clearance (3ft recommended) on all sides of the unit to allow for maintenance and service. Surfaces should provide adequate vibration and deflection prevention, as well as providing a sufficient load rating to support the full weight of the power unit.
- Distance from equipment to be powered should be factored in, and all hydraulic hoses and miscellaneous cables should be of sufficient length as to not place undue stress on outlets.
- Avoid placing the power unit directly on surfaces that are constantly wet as to prevent added potential for unit frame corrosion.

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2-2.3 Ventilation Considerations

- When operating diesel power units in an enclosed environment, assure that the unit is placed in an area with sufficient ventilation to assure that exhaust fumes do not accumulate.

⚠ WARNING

If the power unit is to be placed within an enclosed area, it is imperative that sufficient ventilation be maintained. Local mechanical codes should be consulted when considering indoor placement locations and setups. Poor ventilation may result in the accumulation of exhaust fumes or heat which poses a health risk to personnel. See power unit engine manual for more information.

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2-2.4 Initial Start-Up

1. Remove any shipping restraints that may be present on the equipment
2. **Ensure adequate lubrication, oil, and fuel (if applicable) levels.**
   - Fill hydraulic reservoir with specified hydraulic oil. Ensure suction isolation valve is open.
   - Fill chain drive case with specified gear oil.
   - Lubricate all grease fittings with specified bearing grease.
   - See any third party component's operator's manual for manufacturer specific start up instructions.
3. Attach supply and return hydraulic hoses from corresponding equipment to power unit.
4. (if applicable) Connect air supply line.
5. (if applicable) Position both High and Low PSI switches to the OFF position (if applicable).
6. Assure any shut down valves are set to the RUN position.
7. Start up power unit.
   - Assure that the direction of rotating components on the unit match corresponding rotational direction stickers. Immediately shut down unit if incorrect rotation direction is observed.
   - If upon start up abnormally high engine RPM are observed, power down the system and assure that all hydraulic connections are fully made up and properly secured. High RPM is a symptom of restriction in the supply or return lines may cause motor seal failure.
8. Push air shut valve (if applicable) and allow power unit engine to idle for 5-10 minutes until warm.
9. (if applicable) Position High and Low PSI switches to the ON position.
- Before releasing the equipment to an operational environment, it is recommended that the following tests be performed to assure that equipment damage has not occurred during shipping.
10. Connect the power unit to corresponding equipment and operate the equipment for a duration of one half hour through normal operating parameters.
11. After operation, visually inspect the equipment and hydraulic fittings for obvious malfunction.

2-2.5 Extreme Cold Weather Start-Up Procedure

- Consult the power unit engine manufacturer's operator's manual for all cold weather operating procedures and precautions.
- Select hydraulic fluid and gear & bearing lubricants that are compatible with expected climate conditions.
- If the power unit is equipped with an oil temperature gauge, ensure that the oil has reached an acceptable operating temperature specified by the hydraulic fluid data sheet.

⚠ WARNING

As a minimum, we recommend that all personnel operating or working in the vicinity of hydraulic equipment wear basic PPE (Personal Protective Equipment) such as eye, ear, head, hand, and foot protection. Only trained and mentally competent users should be allowed to directly operate or operate around McCoy equipment.

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2-3.1 General Operation Notes

- When shutting down the unit under normal operation, always use the nominal shut down method (either by means of a starter box or engine pull level) and not the ESD (Emergency Shut Down) switch. ESD switches should only be used in emergency situations as daily use may damage engine components.
- If any abnormal noise or odor is detected during operation, immediately shut down the equipment and perform an inspection to prevent potential damage.

⚠ WARNING

Hydraulic equipment can utilize up to 3,000 psi of high pressure hydraulic fluid. Portions of the tool, including control valves, hydraulic lines, and cylinders may contain high pressure fluid even when the power unit is de-energized and the fluid supply hoses are disconnected. During normal operation the temperature of the hydraulic fluids as well as hoses, piping, valves, etc., can rise to a level which can cause burns. Always wear protective gloves when handling hydraulic lines.

2-3.2 Depressurization Procedure

- Before disconnecting any hydraulic connection, the following procedure must first be completed to ensure the safety of all personnel and to avoid possible damage to hydraulic components.

1. Ensure that the equipment to be depressurized is located in an area with sufficient drainage to handle any expelled hydraulic oil.
2. Consult corresponding equipment's operation manual for proper depressurization procedure to coincide with power unit depressurization.
3. De-energize the hydraulic power supply.
4. Remove the hydraulic supply hose from the equipment.
5. Remove the hydraulic return hose.

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Section 3

3-1 Hydraulic Oil
3-1.1 Hydraulic Fluid Specifications
3-1.2 Hydraulic Fluid Maintenance
3-2 Fastener Torque Specifications
3-2.1 Fastener Torque Specifications

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3-1.1 Hydraulic Fluid Specifications

When replacing hydraulic fluid, always use a fluid that meets or exceeds the standards displayed in the table provided. Use of unapproved hydraulic fluid may lead to equipment damage.

Use the following standards when selecting hydraulic fluid for use in CLINCHER® brand equipment.

NOTICE

It is imperative that ONLY hydraulic fluid that meets the standards listed on this page be used in your hydraulic equipment. Use of unapproved hydraulic fluid, including fire resistant fluids, water based fluids, and high viscosity fluids, or fluids that do not meet the specified standards, may result in extensive equipment damage which is not covered under any warranties.

NOTICE

ALL new fluid that is to be introduced into the system must be cleaned and filtered before being pumped into the hydraulic reservoir.

Hydraulic Fluid Standards	
Specification	Value
ISO Viscosity Grade[1]	68
Base Oil Viscosity: cSt @ 40° C ASTM D 445 cSt @ 100° C	65.0 8.5
Viscosity Index – ASTM D 2270	95
Pour Point – ASTM D 97	-9
Flash Point – ASTM D 92 C(°F)	222 (432)
Demulsibility – ASTM D 1401	41/39/0 (20)
Vickers 104C (IP281) *(or equivalent)*	Pass
Vickers M-2950-S *(or equivalent)*	Quality Level
Vickers I-286-S *(or equivalent)*	Quality Level
TOST – ASTM D 943	2000+

[1]NOTE: ISO 46 grade hydraulic oil may be used in place of ISO 68 oil when utilizing power units equipped with both a hydraulic oil cooler and heater.

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3-1.2 Hydraulic Fluid Maintenance

When implementing hydraulic equipment into a schedule of regular service, it is essential to adopt a regimented, properly administrated hydraulic fluid maintenance schedule. Many costly hydraulic system repairs can be drastically reduced or completely eliminated this way.

Benefits of implementing a regular, properly administered hydraulic fluid maintenance program include:

- Increased system reliability and performance
- Eliminates repair costs due to hydraulic oil contamination
- Saves time and money by keeping equipment in the field rather than the service shop

Fluid Contamination
Hydraulic fluid becomes contaminated when foreign matter is introduced into the hydraulic system, which then leads to internal wear and eventual component damage. Contaminants can be introduced into the hydraulic system in two ways:

Internally Generated Contamination
Failing internal components in a hydraulic system can cause fluid contamination levels to rise to unacceptable levels. This type of contamination will appear as wear debris.

Externally Generated Contamination
External contaminants can be introduced to hydraulic fluid through hydraulic connections, cylinder rods, or improperly sealed hydraulic fluid reservoirs. Keeping exposed cylinder rods and hydraulic quick disconnects free from debris is essential in preventing this type of contamination.

Recommended Testing Standards
Hydraulic fluid testing can be conducted with the use of a portable fluid condition testing kit, or by lab analysis. When setting up a hydraulic fluid maintenance schedule, we recommend a combination of both of these mediums to assure accuracy in testing. While convenient, portable fluid condition test kits are not as accurate or thorough as lab testing.

Testing should be conducted at regular intervals and any time a hydraulic overhaul or major maintenance is performed on the equipment. Test samples should be taken from the return line (upstream of the return filter) when the system is at regular operating temperature. Designating time between testing may vary depending on working environment and end user maintenance policies.

Recommended Filtering Standards
All hydraulic fluid intended for use in McCoy equipment should be filtered to a minimum of 5-10 microns. **All new fluid that is to be introduced into the system must be cleaned and filtered before being pumped into the hydraulic reservoir**.

Filters should be changed regularly. Assuming cleanliness levels are within normal parameters, it is recommended that spin-on type filters be changed after fifty (50) hours of initial use and then after every two hundred fifty (250) hours of use. Use of a filter condition indicator is recommended.

Flushing the Hydraulic System
If testing shows the system's hydraulic fluid is outside of acceptable cleanliness margins, the hydraulic system should be flushed with the use of a filter cart. Once the fluid has been flushed and has returned to optimal cleanliness levels, all filters in the hydraulic system should be changed out. Flushing should also be performed before putting any new equipment into service or after performing system maintenance or overhauling existing equipment.

PLEASE NOTE:
This basic outline is intended to raise the awareness of hydraulic system maintenance of the end user, but is in no way intended to be a complete reference for the implementation of a hydraulic system maintenance program.

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3-2.1 Fastener Torque Specifications

Most fasteners and threaded components listed should be coated with Never-Seez® or equivalent prior to assembly. Certain fasteners or components require the application of Loctite® before installation. It is important to first reference the corresponding assembly drawing to obtain such information.

All tapered pipe thread connections be sealed and locked using Loctite 569™ hydraulic sealant. Use of Loctite cleaning solvents activators 7471™ or 7649™ should be used on inactive metals and to speed curing process.

⚠ WARNING

Use of inferior fasteners or failing to meet the torques specified on this page may lead to equipment malfunction that exposes nearby personnel to significant hazards.

NOTICE

Replacement fasteners are to be GRADE 8 or better.

NOTICE

The use of Teflon tape or Teflon based thread sealing compounds on hydraulic system connections is not advised, as they can cause system contamination.

Fastener Torque Specifications

Fastener Size (in)	Typical Installation	Required Torque (ft-lbs)
1/4 - 20 NC	Tong door switch assembly bolts, tong door guard support strip, tong jaw clip bolts	14
1/4 - 20 Set Screws	Encoder coupling[2], jaw spring clip[2]	N/A
3/8 - 16 Set Screws	Bearing caps[1], door switch adjustment sleeve[4]	N/A
3/8 - 16 NC	Housing cover, brake bands, backup side plates, tong & backup clip bolts	38
1/2 - 13 NC	Top secondary bearing cap, cage plate bolts, locking pin, ring gear key, motor mounts, backup halo, leg bolts	93
5/8 - 11 NC	Tong plates, bearing caps, idler shaft bolts, cam follower nuts, backup cylinder gland bolts, hanger bolts	180
5/8 - 18 NF	Cam follower	55
3/4 - 10 NC	Cage plate spacer bolts, jaw adapter bolts, backup bolts, rigid bail bolts	317
7/8 - 14 NF	Cam follower	512
1 - 8 NC	UHT backup backing bolt	100
1 - 12 NF	Dumbell roller[3], tong door jam nut	N/A
1 - 14 NC	Idler shaft	100
1 1/4 - 12 NF	Backup bulkhead connector	100
1 1/2 - 12 NF	Idler shaft	1200

[1] Coat with removable Loctite®. Tighten until screw contacts bearing, then back off (1) turn.

[2] Tighten until snug.

[3] Tighten until all slack is removed but dumbell roller is free to rotate by hand.

[4] Coat with removable Loctite®. Tighten until snug.

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Section 4

4-1 Maintenance
- 4-1.1 Maintenance Considerations
- 4-1.2 Daily Inspection & Maintenance
- 4-1.3 Decommissioning
- 4-1.4 Storage
- 4-1.5 Recommissioning

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4-1.1 Maintenance Considerations

NOTICE

When carrying out these maintenance procedures, hydraulic fluid and industrial lubricants will be expelled or rinsed off of the equipment. Ensure adequate containment is in place to prevent environmental contamination.

Equipment systems utilizing exterior electrical components must be hand washed. Never directly spray electrical cables or equipment with a high pressure wash.

All third party components (engine, pump, heat exchanger, etc.) that may be present must be maintained according to the original equipment manufacturer's guidelines which are not detailed in this manual.

⚠ WARNING

No maintenance work is to be carried out while the equipment is connected to a hydraulic power supply.

4-1.2 Daily Inspection & Maintenance

1. Wash unit to remove majority of dirt and grease build up to allow for inspection of the overall condition of unit.
2. Inspect for major damage or excessive wear.
3. Inspect all hoses for wear. Replace as necessary.
4. Refer to engine manufacturer's for required engine maintenance procedure.
5. Follow power unit start up procedure. Test unit under normal work load. Re-inspect all hoses and hydraulic system for leaks. Repair or replace if necessary.
6. Check condition indicator on return filter elements. Replace as necessary or at 6 month intervals.
7. Test hydraulic oil for contamination every 6 months under normal operation conditions. Replace with new filtered oil as required.
8. Refer to third party component manufacturer's maintenance literature and carry out as instructed.

4-1.3 Decommissioning

- The following procedure is to be carried out to prepare equipment for short or long term storage. It is imperative that these instructions be strictly observed to ensure maximum longevity.

1. Depressurize the equipment.
2. Disconnect any remaining hoses or lines.
3. Completely drain fluid reservoirs.
4. Wash the exterior of the equipment to remove the majority of dirt and grease buildup.
5. Wash the interior of the equipment thoroughly, using either water (do not use a pressure washer), or an appropriate solvent-based grease cutting cleaner such as Varsol®. If metal shavings or chips are observed being flushed out of the equipment, an overhaul of the equipment must be performed to eliminate the issue and prevent further damage.
6. Thoroughly wash the exterior of the equipment using either water (do not use a pressure washer) or an appropriate solvent-based grease cutting cleaner such as Varsol®.
7. Inspect all paint. Locations in which the paint has been damaged must be repaired

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prior to storage. Prepare areas to be painted to ensure they are free of grease, dirt, or solvent. Touch up with appropriate paint. Allow sufficient time for paint to dry before proceeding.

8. Perform a complete lubrication of all externally accessible grease fittings on equipment.
9. Connect a low-pressure air supply line (10 PSI or less) to the hydraulic supply line, and force a small amount of the remaining hydraulic fluid from the valve assembly. This will allow for thermal expansion of the hydraulic fluid if the equipment is stored or transported in high ambient temperatures. Failure to do this may result in damaged or destroyed seals in the equipment.
10. Wipe all excess grease from outside of equipment. Use a solvent-based cleaner on rags to wipe all external surfaces to remove residual grease or hydraulic fluid. Once the outside surfaces have been de-greased, wipe all external surfaces with clean water to remove residual solvent.
11. McCoy recommends that an anti-corrosive agent such as Tectyl® 506 be applied to all external surfaces (including chain slings) EXCEPT cylinder rods. Refer to manufacturer data sheets for proper application and safety information.
12. Allow the anti-corrosive coating ample time to dry. Refer to manufacturer data sheets for drying times at room temperature.
13. Wrap entire assembly in 100 gauge (1 mil) corrosion-inhibiting wrap, at least 3 layers thick. Ensure that the tool is well sealed within the wrapping, including the bottom.

4-1.4 Storage

- For optimum longevity, it is recommended that equipment be stored in a sealed, climate controlled environment. McCoy recommends using a silica gel desiccant to reduce the humidity within the wrapping. 125 g of desiccant should be used for each cubic meter of space (3.5 g per cubic foot).

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4-1.5 Recommissioning

- The following procedure is to be carried out when removing equipment from storage and into a working environment. This procedure assumes that the equipment in question has been decommissioned in accordance with the steps listed in this manual.

1. Remove all protective plastic wrapping. Dispose of any desiccant packs.
2. Wipe excess grease or heavy oil from exposed cylinder rods (if applicable).
3. If applicable, re-connect chain sling to lifting lugs. Perform a visual inspection of all lifting points. if visible damage is seen, including cracks, broken lugs, distorted metal, etc., replace damaged part(s) before placing equipment in service. If your company requires yearly certification of lifting equipment, ensure that the most recent test date falls within the past year. Perform recertification if necessary.
4. Perform a complete lubrication of all externally accessible grease fittings on equipment.
5. Fill fluid reservoirs to appropriate levels using specified fluids.
6. Perform the start up procedure to energize the power unit.
7. Assure pressure and temperature are nominal.
8. Perform a thorough inspection of pressurized hydraulic lines and fittings. Any leaking hydraulic fluid lines or fittings must be replaced before the equipment is returned to service.
9. Perform a thorough inspection of all seals. Any seal that is leaking or “weeping” must be replaced before the equipment is returned to service.
10. Run power unit under normal work load to ensure proper functionality.
11. When all of the previous steps are completed, you may return your re-commissioned equipment to service.

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Section 5

5-1 General Troubleshooting

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Problem									Action Key	
Insufficient System Pressure									F	Flush hydraulic fluid & replace
	Hydraulic Pump Making Excessive Noise								CH	Check fluid levels, add as necessary
		High Operating Temperature							CL	Clean / clear debris
			Excessive Wear to Hydraulic Components						L	Inspect for fluid leaks, repair as necessary
									R	Repair or replace
									IN	Inspect, realign / adjust / re-calibrate to correct value
									LU	Lubricate components
								Possible Cause		**Relevant Manual Section**
●	●	●						Fluid contamination	F	Hydraulic Fluid Maintenance
●		●	●					Components misaligned	IN	
		●	●					High operating pressures	IN	
			●					Exhausted fluid (depletion of additives)	F	Hydraulic Fluid Maintenance
	●		●					Air in fluid / fluid suction above fluid level in reservoir	L / CH	
	●							Restricted supply line / clogged reservoir intake	CL / L	
●	●							Low fluid level	CH / L	
●	●	●	●					Damaged or worn equipment	R	
	●							Restricted vent	IN / R	
	●	●						Excessive RPM	IN / R	
	●	●	●					Increased friction	IN / R	
	●							Damaged relief valve or check valve	R	
	●							Restricted discharge	CL / IN	
	●							Valve system restricted	CL / L	

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www.mccoyglobal.com

McCoy Drilling & Completions
4225 Hwy 90 East • Broussard, LA USA
T: 337.837.8847
F: 337.837.8839
dcsales@mccoyglobal.com